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COTTON-LOUSE



CONTROL



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The cotton louse, or aphid,¹ has long been known as a pest of cotton. For many years it attracted attention, primarily early in the season, causing damage to young plants in the seedling stage or shortly thereafter. This damage is usually most prevalent in a period of cool weather, and the lice disappear as the weather becomes warmer and the cotton increases in size. The actual loss from such an attack is usually not serious enough to justify direct control measures, as it consists mainly of retardation of growth and possibly some loss of stand, but in some instances this is important enough to warrant control measures.

LOUSE INFESTATION ON FRUITING COTTON

During recent years there has been an increased interest in louse control, owing to more frequent occurrences of severe infestation in the latter part of the season when the cotton is fruiting heavily. This has been complicated further by the extensive use of calcium arsenate against the boll weevil² and the fact that, under certain combinations of circumstances, calcium-arsenate dusting may increase the louse infestation in the field, largely by killing certain insect enemies of the louse. Experiments have shown that lice usually do not appear in injurious numbers until after at least three applications of calcium-arsenate dust have been made during a period in which little or no rain has fallen, and then only when certain species of parasites which are destroyed by the dust applications are the main natural factor in the control of the louse. Under such circumstances, the extent of these outbreaks varies with the locality and the season. A survey conducted over a series of years throughout the territory where commercial dusting is generally practiced showed that such

¹ *Aphis gossypii* Glover.

² The method of using calcium arsenate in boll-weevil control is described briefly in the following publication, which will be sent free if a request is addressed to the U. S. Department of Agriculture: COAD, B. R., and GAINES, R. C. POISONING THE COTTON BOLL WEEVIL. U. S. Dept. Agr. Leaflet 37, 4 p. 1929.

louse infestation occurred in less than 5 per cent of the cases where calcium-arsenate dust was applied.

When an infestation occurs late in the season it is shown by the curling and shedding of the leaves, and, in case of very heavy infestation, by the fact that the lower portions of the plant become covered with the sticky honeydew thrown off by the lice. This honeydew in many instances supports a growth of black mold, which gives the lower stems and bolls a smutty appearance. Usually the most serious financial loss from louse infestation is in the lowering of the grade of the staple due to the staining and gumming effect of this honeydew. The actual loss in crop is usually deceiving and is much more apparent than real. However, cases of extreme infestation may cause reduction in yield, and records show that such losses amount to an average of about 50 pounds and a maximum of 100 pounds of seed cotton per acre.

HOW TO CONTROL THE COTTON LOUSE

Where a louse infestation has developed to the point of injury, control can be accomplished if the following rules are followed carefully:

Nicotine dust should be used.

This dust should be mixed at home and should not be allowed to stand more than 48 hours before use.

Applications should be made only when the air is calm and there is a good prospect that it will remain calm for at least 30 minutes after the application. This is of the utmost importance, as applications during a breeze are wasted. High temperature and dry foliage are favorable to a good kill.

One application, made under proper conditions, will usually be sufficient for commercial control, but additional applications should be made later whenever injury threatens.

Make applications with the same cotton-dusting machinery as used for boll-weevil dusting.

If an application of calcium arsenate is needed for weevil control at the same time as the louse application, the calcium arsenate should be used as a carrier for the nicotine.

In other instances a good grade of hydrated lime or air-slaked lime should be used as a carrier.

To make this nicotine dust, thoroughly mix 100 pounds of the carrier with $6\frac{1}{4}$ pounds or 5 pints of commercial 40 per cent nicotine-sulphate solution. Apply the dust at a rate slightly heavier than would be used on cotton of the same size for boll-weevil control. This means about 6 to 9 pounds per acre.

HOW TO MIX THE DUST

The main thing to be remembered is that the success of the whole operation depends upon thorough mixing. Commercial concerns selling nicotine-sulphate solution furnish instructions for making different types of home-mixing devices which can be constructed at very small cost. One of the most satisfactory methods³ of mixing the dust

³ CHITTENDEN, F. H., and WHITE, W. H. THE MELON APHID AND ITS CONTROL. U. S. Dept. Agr. Farmers' Bul. 1499, 17 p., illus. 1926.

is by the use of a home-made ball mill, such as is illustrated in Figure 1. This can be made from a 50-gallon vinegar barrel, and stones (about the size of hens' eggs) can be substituted for balls. A section about 6 by 14 inches is cut in the side of the barrel, and the pieces taken out are fastened together with pieces of half-inch strap iron on the inner side to constitute the door. The door is hinged and equipped with a fastener. The edges of the opening or of the lid are padded with any convenient material in order to prevent leakage. A piece of pipe 1 inch in diameter and 10 inches long is attached to the exact center of each end of the barrel by means of a flanged bushing to form the axle upon which the barrel revolves. A crank made from material 2 by 4 by 15 inches is attached to one end of the axle, and a short piece of half-inch pipe set at right angles to the arm serves as a handle. The barrel is mounted on a stand which may conveniently be



FIGURE 1.—Ball mill for mixing nicotine dust

made from two trestles about 36 inches high, with a notch in which the axle rests cut in the top of each trestle. To hold the barrel steady, with the opening conveniently placed for putting into it the stones and the material to be mixed, a bolt is passed through a hole in the trestle and into a suitable opening in the support for the flange on the end of the barrel, as shown in the picture. The barrel can be mounted on other types of stands, but should in any case be high enough from the floor to permit ease of operation and the ready placement and removal of a container to catch the dust when the ball mill is emptied. This container should be at least 3 feet long, 2 feet wide, and 1 foot deep. A coarse screen should be placed over the container to separate the stones from the dust. Use one-half pound of stones to each pound of dust. After the nicotine is added, close the lid of the mill tightly and turn the barrel for five minutes at the rate of about 35 turns a

minute. The rate of turning should not be greater than this, and the time in turning should not be less than five minutes in order to assure a proper mixing of the dust. When the dust is taken from the mill it should be poured through the coarse screen into a box or other container to separate the stones. If any dust sticks to the sides of the barrel it can be removed by tapping the barrel on the outside. If the dust is not to be used shortly after it is prepared, it should be stored in air-tight containers, such as metal drums or lard tins. Dust which is being prepared for immediate use can be placed in paper lime sacks and hauled to the field.

Another method is to mix the material by rolling on the ground drums of dust to which the proper quantity of nicotine has been added, after putting stones (as in the ball mill), or sections of ordinary water pipe from 1 to 2 inches in diameter and approximately 2 inches shorter than the length of the barrel, in the mixture to assist in stirring. This rolling can be done by making a mule-drawn frame sled so arranged that the drum fits into the opening between the runners and is held by cross-pieces so as to allow it to roll on the ground as it is pulled along. When stones or other foreign objects are put into the dust to help in mixing, extreme care should be taken to see that these are screened out before the dust is put into a dusting machine.

Cost of Nicotine Dust

The cost of the nicotine under present market conditions is about 6 to 8 cents per pound of dust mixture. To this must be added the cost of the carrier and of mixing.

No Increased Infestation from Year to Year

Fear is often expressed that the number of lice in a cotton field may increase from year to year. This fear is unfounded, as there is no evidence that abundance of lice one year leads to an increasing number the next.

